MC SERIES MATERIAL TEST/CURE CHAMBER

MC Series Overview

Available in a variety of sizes, the Darwin MC Series Materials Test Chambers are ideal for the rigors of precision temperature and humidity control in concrete, asphalt, and related industries. Unlike the vast majority of "testing" apparatus available to control temperature / humidity for engineering demands, these chambers provide reliable operation, durable construction and accurate results. The MC Series offers serious performance to engineers and researchers looking for serious results.

To set the MC Series apart from typical "environmental chambers" or "home built units," we have incorporated a number of features to produce the best chamber to meet ASTM, ACI, AASHTO, and other standards. Some ASTM standards we conform to are C309-06, C156-05, C511-13, C666, C31, C192.

MC034

The MC034 is a 1-door environmental chamber.

MC068

The MC068 is a larger 2-door environmental chamber.

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The MC Series chambers feature hot gas bypass technology which controls the temperature of the epoxy coated evaporator for greater uniformity. Compressors in our KB Series of environmental chambers come with a three-year warranty, which is one of the longest in the industry. Compressors on the 011,034, and 068 are mounted on a removable lid for easier replacement. This helps for onsite repairs, not needing a burn permit to replace compressors. All these models run with 0.25 - 0.67hp compressors making them efficient enough to run on 15-amp, 115-volt circuits. KB Series includes a Multi-Port on every chamber. The Multipurpose Port can be used to add options to the chamber after the time of delivery, such as compressed dry air, desiccant wheel dryers or fresh air blowers. They also can be opened to release humidity, if necessary.

Superior Control and Uniformity

The ultrasonic humidification system provides excellent humidity control and avoids hot spots seen during chamber mapping of steam boiler equipped chambers. Standard control at the sensor in these chambers is ±0.2°C and ±0.3%RH, uniformity that meets or exceeds ICH guidelines. All sensors are calibrated using NIST traceable standards before shipment of the chamber.

Options Available

Extended Temperature Range**
Chart Recorders
Data Loggers
Pneumatic & Desiccant Wheel Dryers**
Window or Glass door. **
Full swinging interior glass door
Magnetic latch door handle with lock and two keys (011 and 034)
Touch Screen interface
Headless interface (Virtual Touch Screen VTS)
Other control Options or monitoring i.e., CO_2.
Adjustable Fan Speeds. **
Air exchanges filtered or non-filtered with ambient space.**
Condensate drain pumps.
Interior or exterior electrical outlets. (Limited power) **
Stainless Steel Exterior (030, 055 and 084)
5 gallon carboy (if no hookup to waterline available)
Door ajar alarm, power loss alarm
Back-up Control / Conditioning
Ethernet / Remote Monitoring / Alarming Multi-Point Digital Recording
Water-Cooled Condensers
Freeze / Thaw Operation

***Some Options may limit chamber performance less or greater than specified here.*

Greatly Reduced Direct and Indirect Energy Loads

The KB Series chambers utilize less energy than comparable stability chambers and introduce less impact upon building cooling systems. This efficiency “dual benefit” allows our chambers to be in spaces unsuitable for other chambers. Electrical energy savings by the KB Series vs. steam boiler equipped chambers can easily amount to hundreds or thousands of dollars saved per year. Based on Alarm event settings the chambers controller can optimize performance to use or not use compressor depending on set point temperature.

Widely Proven, Non-Proprietary Controllers

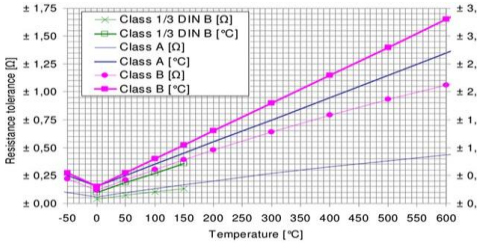
Standard controllers for the KB Series are manufactured by Fuji Electric and are ideal for stability testing chambers. Unlike many proprietary controllers, this controller is commercially available and proven in tens of thousands of installations. Standard functions include: autotuning, fuzzy logic, PID control, programmable alarms, calibration correction capability, ramp/soak, uniformity offset capability, etc. A touchscreen control interface is optional. Other controller manufacturers are also supported (Watlow, Allen Bradley etc.)

Services and Warranties

We offer technical support throughout the lifetime of your chamber. In addition to standard warranties, we also offer extended warranties for cooling components, parts, and labor. We also provide qualifications, validations, and preventive maintenance services at an additional cost.

MC Series Environmental Chamber Specifications (ambient 23° C)

Specifications are subject to change without prior notice

Temperature		
Performance	**Standard**	**Optional**
Temperature Range	2° C to 50° C (Defrost Set-Up at and Below 4° C)	-20° C to 2° C
Ambient Temperature	21° C ± 3° C	
Temperature Control	± 0.5° C	
***Temperature Uniformity**	NA	
Control Resolution	+/- 0.1° C	
Temperature Sensor Type	3 wire PT100 Class A RTD 	

** We place 5 sensors in the chamber, one in each corner (vertically) and one in the center. We log it overnight and look at the min to max across all points.*

Humidity		
Performance	**Standard**	**Optional**
Humidity Range	Ambient Absolute Humidity* to 90% Relative Humidity @ 42°C Dewpoint	2 to 95% @ 22° C (or other ranges)
Humidity Control	± 0.3%	
Humidity Uniformity	± 2 %	
Control Resolution	0.1%	

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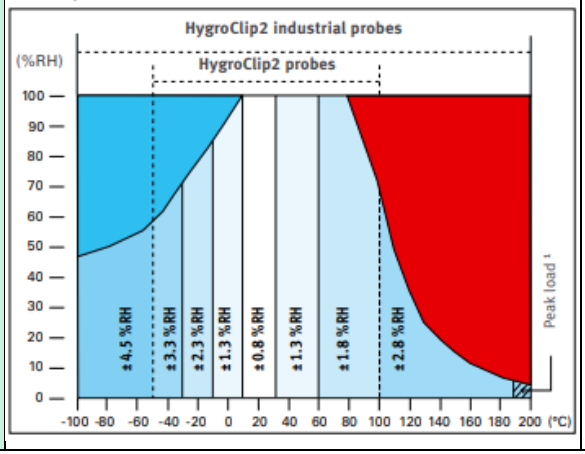
Humidity Sensor	Rotronic HC2A-S Operating range -50...100 °C / 0...100 %RH Accuracy: ±0.8 %RH, ±0.1 K, at 23 °C ±5 K Digital interface (UART) and scalable analogue outputs,**RH Sensor** 0...1 V **Accuracy Overview** 	Vaisala or other

**Absolute Humidity is the amount of moisture in the air in a particular environment.*

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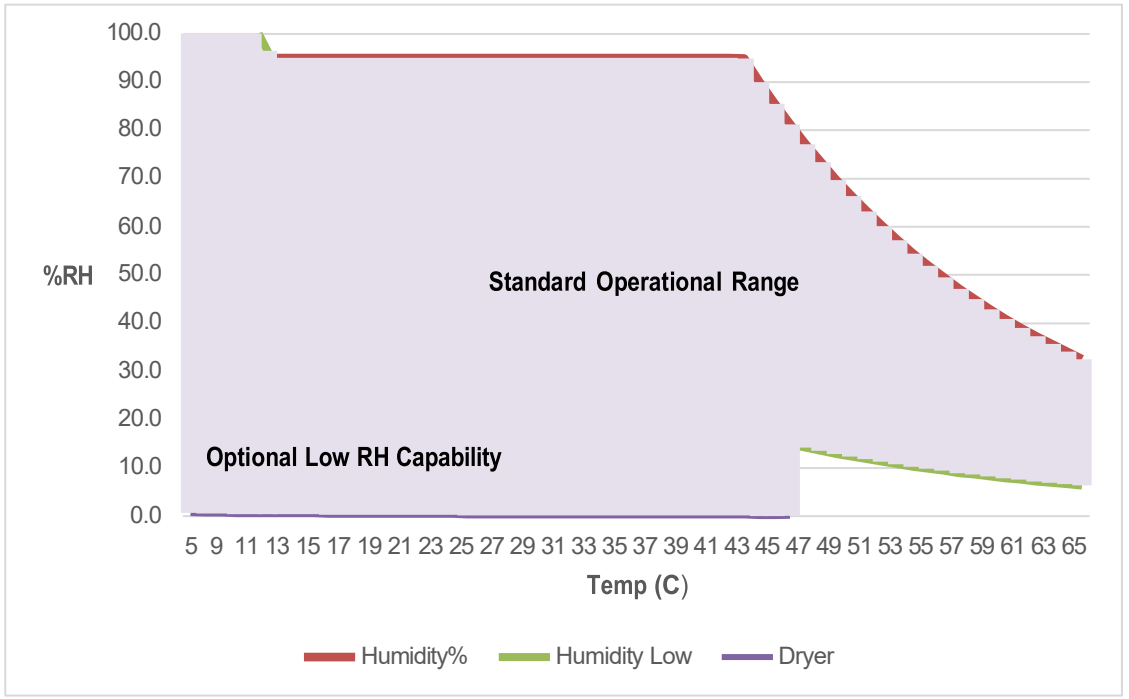
The humidity chart below shows the chamber's humidity capabilities.
How to read the chart below:

The Humidity% Line in red is the max humidity level that can be achieved by staying within the 42°C dew point. Humidity levels above this line are not recommended. The Humidity Low line in green is the lowest the chamber can go without the use of a dryer. This is based on ideal performance and ambient condition of 23°C and 50% RH. Lower or higher ambient conditions will impact the lower humidity capabilities of your chamber. If your set points are near this line or below it is recommended to add dryer capabilities to your chamber. The Dryer Line in purple represents the use of a pneumatic dryer with a -40 Dew Point. To reach such low humidity, a constant supply of dry air is needed, and manual adjustment to humidity valve may be needed. Alternatively, if low %RH (low dewpoint) is desired but dry compressed air is not available, other dryer types are available.

Humidity% represents chamber performing at 42°C Dew point.



Humidity Low represents absolute humidity at ambient space of 23°C and 50%RH.

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Control System	Standard	Optional
Controller	Fuji PXF4	VTS (Virtual Touchscreen), Gefran 650, Future Design Controls CM and MCT4 + More
Control Readout	 Actual and Set-Point Values	Trending, Duty Cycle
Indication Accuracy	RTD input: ±0.2% of indication value ±1 digit or ±0.5°C±1 digit, whichever is larger	Dependent on optional Controller
Sample Rate	Fast as 50 ms	Dependent on optional Controller
Control Speed	Fast as 100 ms	Dependent on optional Controller
Control Type	PID - Fuzzy Logic (9 types available)	Dependent on optional Controller
Auto Tuning	YES	Dependent on optional Controller
Calibration Correction Capability	±0.1 lower and upper scale	Dependent on optional Controller
Uniformity Off Set	±0.1 Resolution Linear adjustment	±0.1 Resolution
Alarm	High / Low Audible and Visual	Text, Email, Web Server, Remote Access
Alarm Type	High / Low Deviation in 0.1 resolution with adjustable Delay. Control audible alarm enable or disable components.	Absolute & Deviation 0.1 Resolution with Delay
Remote Monitoring / BMS connection	Double throw Dry Contact Alarm, RS 485 MODBUS RTU / ASCII**	Ethernet & Analog Output (Specify voltage or mA)
Password Protection	Hexadecimal	Numeric, Alpha Numeric
Audit Trail	Not Standard*	Dependent on optional Controller
Universal Power Supply for Monitoring	Not Standard	Available. *Controllers and sensors powered duringoutage for data logging. Chamber operation not supported.*
Ramp Soak Function	Up to 64 steps. A Step includes a ramp and soak. Up to 8 patterns / programs (recipes).	Dependent on optional Controller

**Applies with touchscreen or VTS option.*
***For BACNET or MODBUS TCP (Ethernet) please contact your BMS vendor about using a gateway to interface with controllers via the RS485*

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	MC034	MC068
MC		
Exterior	Powder Coated Finish	Powder Coated Finish
Exterior Material Thickness	Heavy Gauge	Heavy Gauge
Interior	304 Stainless Steel	304 Stainless Steel
Interior Material Thickness	.036”	.036”
Door QTY	1	2
Door Lock	Optional	Optional
Door Swing	+180°	+180°
Door Gasket	Magnetic Gasket	Magnetic Gasket
Shelving Material	304 Stainless Steel	304 Stainless Steel
Shelf Quantity per Door	3	3
Casters Height	2.75”	2.75”
Caster QTY	4	5
Caster Locking Brakes	2	2
Access Port Qty	2	2
Multi-Purpose ports	YES	YES

Continuous coil coated is treated metal before it is cut and formed, the entire surface is cleaned and treated, providing tightly bonded finish. Formed sides have holes, valleys, recessed areas, and hidden areas that make it difficult to clean and uniformly coat. Coil coated metal is often considered more durable and corrosion resistant than most painted metal as it is treated before shaped.

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MC		
NET Capacity*	29.0 ft³	62.6 ft³
Conditioned Space	32.1 ft³	69.3 ft³
External Dimensions	35.7W x 33.8D x 80.8H	68.4W x 34.2D x 81.8H
Internal Dimensions	29.4W x 29.0D x 57.3H	64.2W x 29.4D x 57.3H
Access Port Dimensions	2" ID with Foam Insert	2" ID with Foam Insert
Recommended Clearance	Top 12"	Top 12"
	Rear 6"	Rear 6"
	Sides 6"	Sides 6"
Shelf Dimensions	28.75W x 26D	31.4W x 24.25D
Shelf Weight Capacity	150 lbs.	150 lbs.
Approx. Max Storage weight	700	1000
Approx. Crated Weight	765 lbs.	1100lbs

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Compressor Size	1/3 hp	½ hp
Refrigerant	134a	134a
Charge (oz)	13.5 oz	18.5 oz
Defrost	Optional	Optional
Heater Watt Size	350	500
Heater Qty	1	1
Perimeter Heater	YES	YES
Air flow direction	Front to Back	Front to Back
Fan Count	3	6
Fan CFM per fan	125	125
Variable Speed	Manual Adjust	Manual Adjust
Humidity	Yes	Yes
Water quality		
Max Water consumption	1200 ml / 0.32 Gal per Hour	1200 ml / 0.32 Gal per Hour
Water Connection	¼" poly tube push to connect	¼" poly tube push to connect

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			MC034		MC068	
MC						
Electrical North America						
Voltage	115 VAC/ 60 Hz					115/208-230 VAC /60HZ Chamber & 115 VAC /60Hz Dryer NEMA L14-20P
RLA	8.0	6.5	8.0	12.0	12.0	12.0
Heat Rejection	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1490 Btu/h / **High** 6122 Btu/h	**Low** 1490 Btu/h / **High** 6122 Btu/h	**Low** 2216 Btu/h / **High** 8784 Btu/h
Cord Length NEMA 5-15P	9 ft	9 ft	9 ft	9 ft	9 ft	9 ft
Dedicated Circuit	15 A	15 A	15 A	15 A	15 A	15 A
Electrical International via Buck Boost Transformer						
Voltage	230 VAC/ 50 Hz					
RLA	4.0	3.3	4.0	6.0	6.0	6.0
Heat Rejection	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1108 Btu/h / **High** 4392 Btu/h	**Low** 1490 Btu/h / **High** 6122 Btu/h	**Low** 1490 Btu/h / **High** 6122 Btu/h	**Low** 2216 Btu/h / **High** 8784 Btu/h
Cord Length	2.74 m	2.74 m	2.74 m	2.74 m	2.74 m	2.74 m
Accessory connections						
BMS Dry Contact	Screw terminal 3 position Common / Normally Closed / Normally Open					
RS485 MODBUS	1/8" or 2.5mm stereo input jack					
Optional Re transmission	Screw terminal					
Dry Air solenoid	Screw Terminal					
Desiccant Wheel Dryer	Twist lock 4 pin din connector					
Aux 24VDC output (500	5.2 mm Barrel Connector					

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	KB011	KB030	MC034	KB055	MC068	KB084
MC						
mA limit)						

**Interior Capacity includes the 2" spacing from interior walls to allow for best air flow performance.*
***Include width with handle and height with castors installed.*
RLA and heat rejection is based on a controlled operation temperature of 30C and 65% RH. Value may change on operating set points.